	Universitas Negeri Surabaya Faculty of Engineering, Building Engineering Education Undergraduate Study Program	**Document Code**

SEMESTER LEARNING PLAN

Courses	CODE	Course Family	Credit Weight			SEMESTER	Compilation Date
Civil Building Design	8320504298	Compulsory Study Program Subjects	**T=4**	**P=0**	**ECTS=6.36**	5	February 9, 2022

AUTHORIZATION	SP Developer	Course Cluster Coordinator	Study Program Coordinator
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Learning model	**Case Studies**
Program Learning Outcomes (PLO)	**PLO study program that is charged to the course**
	Program Objectives (PO)
	PLO-PO Matrix

	P.O

PO Matrix at the end of each learning stage (Sub-PO)

P.O	Week															
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16

Short Course Description	The complete civil building planning course is carried out on buildings with 4-5 floors, the tasks carried out include planning the steel construction for the roof (gording, trestle and wind ties), trusses (saddles or joglos) and if necessary column planning from the profile steel for the top floor, then planning concrete construction for floor plates (1-way plates and 2-way plates), beams (ring beams, longitudinal and transverse), columns and foundations (shallow and deep foundations). In this course, the working load planning must be described first so that the structural analysis can be calculated and phased according to the planning section. For roofs and trusses, the steel profile used must be planned and controlled for its capacity against internal forces from external loads so that the specified profile can be categorized as safe or not. For the floors, beams, columns and foundations used, the thickness and cross-section dimensions must be planned and the reinforcement requirements calculated as well as the reinforcement drawings. Structural analysis calculations using the help of civil application software (SAP and others) and drawing of building plans as well as pre-design and detailed drawings with the help of CAD. In this course, the learning model used is based on project studies and the assessments used are portfolio-based in the form of reports.
References	**Main :**

1. Segui, William T. 2007. Steel Design. Canada: Thomson.
2. McCormac, Jack C. 2008. Structural Steel Design . United States of America: Pearson International Edition.
3. Lam, Dennis, etc. 2004. Structural Steel Work. United States of America: Pearson International Edition.
4. Nawy, Edward G. 1998. Beton Bertulang Suatu Pendekatan Dasar. Bandung: PT. Refika Aditama.
5. Asroni, Ali. 2010. Balok dan Pelat Bertulang. Yogyakarta: Graha Ilmu.
6. Dipohusodo, Istimawan. 1994. Struktur Beton Bertulang . Jakarta: Gramedia Pustaka Utama.
7. Arifi, Eva, etc. 2022. Perencanaan Struktur Baja (berdasarkan SNI 03-1729-2020). Malang: UB Press.
8. Suyono. 2007. Peraturan Pembebanan Indonesia untuk Gedung
9. Anonim. 2020. SNI-03-1729 - Tata Cara Perencanaan Struktur Baja Untuk Bangunan Gedung . Jakarta: DPU.
10. Anonim. 2019. SNI-03-2847 - Tata Cara Perhitungan Struktur Beton Untuk Bangunan Gedung . Jakarta: DPU.
11. Anonim. 2019. SNI-1726 - Tata Cara Perencanaan Ketahanan Gempa Untuk Struktur Bangunan Gedung dan Non Gedung . Jakarta: DPU.
12. Subagio,Triono ,etc. 2020. Menggambar dan merencanakan dengan Autocad untuk arsitektur dan Teknik sipil. Jakarta: Cipta Prima Nusantara
13. Anonim. 2020. SNI-03-1727 - Beban Desain Minimum Dan Kriteria Untuk Gedung. Jakarta: DPU.

Supporters:	

Supporting lecturer	Muhammad Imaduddin, S.T., M.T. Arie Wardhono, S.T., M.MT., M.T., Ph.D. Mochamad Firmansyah Sofianto, S.T., M.Sc., M.T. Wahyu Dwi Mulyono, S.Pd., M.Pd. Meity Wulandari, S.T., M.T.

Week-	Final abilities of each learning stage (Sub-PO)	Evaluation		Help Learning, Learning methods, Student Assignments, [Estimated time]		Learning materials [References]	Assessment Weight (%)
		Indicator	Criteria & Form	Offline (*offline*)	Online (*online*)		
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
1	Students are able to design civil building planning drawings	- Describe the floor plan of a multi-storey building. - Provide clear information on the function of buildings and rooms. - Describe the roof plan plan. - Describe floor plans, beams and columns. - Describe the cross-section and longitudinal sections of the building.	**Criteria:** Qualitative **Forms of Assessment** : Participatory Activities, Project Results Assessment / Product Assessment, Portfolio Assessment	- Group discussion - Case study 4 X 50		**Material:** Civil building planning drawings **References:** *Subagio, Triono, etc. 2020. Drawing and planning with Autocard for architecture and civil engineering. Jakarta: Cipta Prima Nusantara*	5%
2	Students are able to design civil building planning drawings	- Describes the longitudinal and cross sections of the building.	**Criteria:** Qualitative **Forms of Assessment** : Participatory Activities, Project Results Assessment / Product Assessment, Portfolio Assessment	- Group discussion - Case study 4 X 50		**Material:** Design of civil building planning drawings **References:** *Subagio, Triono, etc. 2020. Drawing and planning with Autocard for architecture and civil engineering. Jakarta: Cipta Prima Nusantara*	5%

3	Students are able to calculate the load from the roof for planning curtains, handlebars and wind ties and control capacity for safe conditions.	- Create a preliminary design for a building consisting of steel and concrete elements	**Criteria:** Qualitative **Forms of Assessment** : Participatory Activities, Project Results Assessment / Product Assessment, Portfolio Assessment	- Group discussion - Case study 4 X 50		**Material:** Steel roof planning **Reference:** *McCormac, Jack C. 2008. Structural Steel Design. United States of America: Pearson International Edition.* **Material:** Steel roof planning **Reference:** *Lam, Dennis, etc. 2004. Structural Steel Work. United States of America: Pearson International Edition.* **Material:** Roof loading **Reference:** *Anonymous. 2020. SNI-03-1727 - Minimum Design Loads and Criteria for Buildings. Jakarta: DPU.* **Material:** Roof loading **Reference:** *Suyono. 2007. Indonesian Loading Regulations for Buildings*	5%
4	Students are able to calculate the truss planning loads and calculate rod forces.	- Describes the load that works from the roof to the trusses. - Calculate the amount of load acting at each truss node. - Create a structural model in a structural analysis program using a computer. - Operate computer programs to model stance, input loads and obtain support reactions and bar forces.	**Criteria:** Qualitative **Forms of Assessment** : Participatory Activities, Project Results Assessment / Product Assessment	- Group discussion - Case study 4 X 50		**Material:** Calculation of truss roofs **Reference:** *Segui, William T. 2007. Steel Design. Canada: Thomson.* **Material:** Calculation of truss roofs **Reference:** *McCormac, Jack C. 2008. Structural Steel Design. United States of America: Pearson International Edition.* **Material:** Calculation of truss roofs **Reference:** *Lam, Dennis, etc. 2004. Structural Steel Work. United States*	0%

						of America: Pearson International Edition. **Material:** Calculation of truss roofs **Reference:** *Arifi, Eva, etc. 2022. Steel Structure Planning (based on SNI 03-1729-2020). Malang: UB Press.* **Material:** Calculation of truss roofs **Reader:** *Suyono. 2007. Indonesian Loading Regulations for Buildings* **Material:** Calculation of truss roofs **Reference:** *Anonymous. 2020. SNI-03-1727 - Minimum Design Loads and Criteria for Buildings. Jakarta: DPU.* **Material:** Calculation of truss roofs **Reference:** *Anonymous. 2020. SNI-03-1729 - Procedures for Planning Steel Structures for Buildings. Jakarta: DPU.*	

5	Students are able to plan connections and control for tension and compression members	- Planning connections at truss node points. - Calculate the nominal strength of the connection. - Calculate the number or length of connections used.	**Criteria:** Qualitative **Forms of Assessment** : Participatory Activities, Project Results Assessment / Product Assessment, Portfolio Assessment	- Group discussion - Case study 4 X 50		**Material:** Calculation of steel structure connections **Library:** *Arifi, Eva, etc. 2022. Steel Structure Planning (based on SNI 03-1729-2020). Malang: UB Press.* **Material:** Calculation of steel structure connections. **Reference:** *Segui, William T. 2007. Steel Design. Canada: Thomson.* **Material:** Calculation of steel structure connections **. Reference:** *Lam, Dennis, etc. 2004. Structural Steel Work. United States of America: Pearson International Edition.* **Material:** Calculation of steel structure connections. **Reference:** *Anonymous. 2020. SNI-03-1729 - Procedures for Planning Steel Structures for Buildings. Jakarta: DPU.*	5%

6	Students are able to plan the dimensions of plates, beams and columns.	- Planning the loading requirements for each room. - Calculating the tributary area on beams and columns. - Calculating the loading on the portal. - Calculating the load distribution on each level for equivalent static earthquake loading.	**Criteria:** Qualitative **Forms of Assessment** : Participatory Activities, Project Results Assessment / Product Assessment, Portfolio Assessment	- Group discussion - Case study 4 X 50		**Material:** Dimensional planning for plates, beams and columns. **References:** *Nawy, Edward G. 1998. Reinforced Concrete A Basic Approach. Bandung: PT. Refika Aditama.* **Material:** Dimensional planning for plates, beams and columns. **References:** *Asroni, Ali. 2010. Reinforced Beams and Plates. Yogyakarta: Graha Ilmu.* **Material:** Dimensional planning for plates, beams and columns. **Reader:** *Anonymous. 2019. SNI-03-2847 - Procedures for Calculating Concrete Structures for Buildings. Jakarta: DPU.* **Material:** Dimensional planning for plates, beams and columns. **Reader:** *Dipohusodo, Istimawan. 1994. Reinforced Concrete Structures. Jakarta: Gramedia Pustaka Utama.*	5%
7	Students are able to calculate slab reinforcement plans for both 1-way slabs and 2-way slabs.	- Planning the load calculation on the plate. - Calculate moment analysis on plates in either 1 direction or 2 directions. - Calculating slab reinforcement in both 1 and 2 directions	**Criteria:** Perfect score if answered correctly **Forms of Assessment** : Participatory Activities, Project Results Assessment / Product Assessment, Portfolio Assessment	- Group discussion - Case study 4 X 50		**Material:** Plate reinforcement planning **References:** *Nawy, Edward G. 1998. Reinforced Concrete A Basic Approach. Bandung: PT. Refika Aditama.* **Material:** Plate	10%

						reinforcement planning **Reference:** *Asroni, Ali. 2010. Reinforced Beams and Plates. Yogyakarta: Graha Ilmu.* **Material:** Plate reinforcement planning **Reference:** *Dipohusodo, Istimawan. 1994. Reinforced Concrete Structures. Jakarta: Gramedia Pustaka Utama.* **Material:** Plate loading planning **Reference:** *Suyono. 2007. Indonesian Loading Regulations for Buildings* **Material:** Plate p planning Plate loading planning **Reference:** *Anonymous. 2020. SNI-03-1727 - Minimum Design Loads and Criteria for Buildings. Jakarta: DPU.* **Material:** Plate reinforcement planning **Reference:** *Anonymous. 2019. SNI-03-2847 - Procedures for Calculating Concrete Structures for Buildings. Jakarta: DPU.*	
8	Students are able to calculate plans for reinforcing stairs and landings.	- Plan the thickness of the stair plate and landing, the width of the steps and the height of the steps. - Planning load calculations on stairs. - Calculating moment analysis on the ladder mechanics model. - Calculate the	**Criteria:** Qualitative **Forms of Assessment** : Participatory Activities, Project Results Assessment / Product Assessment, Portfolio Assessment	- Group discussion - Case study 4 X 50		**Material:** Calculation of reinforcement for stair structures **Reference:** *Nawy, Edward G. 1998. Reinforced Concrete A Basic Approach. Bandung: PT. Refika Aditama.*	10%

		need for stair reinforcement.				**Material:** Calculation of reinforcement for stair structures. **Reference:** *Asroni, Ali. 2010. Reinforced Beams and Plates. Yogyakarta: Graha Ilmu.* **Material:** Calculation of reinforcement for stair structures. **Reference:** *Dipohusodo, Istimawan. 1994. Reinforced Concrete Structures. Jakarta: Gramedia Pustaka Utama.* **Material:** Stair structure loading **Reader:** *Suyono. 2007. Indonesian Loading Regulations for Buildings* **Material:** Stair structure loading **Reference:** *Anonymous. 2020. SNI-03-1727 - Minimum Design Loads and Criteria for Buildings. Jakarta: DPU.* **Material:** Calculation of reinforcement for stair structures. **Reference:** *Anonymous. 2019. SNI-03-2847 - Procedures for Calculating Concrete Structures for Buildings. Jakarta: DPU.*	

9	Students are able to calculate earthquake planning for a predetermined area.	- Calculate the total weight of each floor and add up the total floor load. - Calculate the basic earthquake coefficient for the response-spectra or vibration time so that the earthquake force value can be calculated. - Calculate the distribution of earthquakes to each floor.	**Criteria:** Perfect score if answered correctly **Forms of Assessment** : Participatory Activities, Project Results Assessment / Product Assessment, Portfolio Assessment	- Group discussion - Case study 4 X 50		**Material:** Earthquake load calculations **Reference:** *Anonymous. 2019. SNI-1726 - Procedures for Earthquake Resistance Planning for Building and Non-Building Structures. Jakarta: DPU.*	10%
10	Students are able to determine the portal that will be calculated with the help of the SAP 2000 program.	- Create a portal model according to plans and drawings. - Provide completeness for the portal model. - Input load on portal model. - Carry out program analysis and issue analysis results from the SAP program.	**Criteria:** Perfect score if answered correctly **Forms of Assessment** : Participatory Activities, Project Results Assessment / Product Assessment, Portfolio Assessment	- Group discussion - Case study 4 X 50			5%

11	Students are able to calculate longitudinal beam reinforcement plans.	- Determine the maximum field moment and maximum support moment on 1 beam. - Calculate reinforcement requirements and determine the reinforcement to be installed. - Create reinforcement calculation tables for other beam conditions.	**Criteria:** Perfect score if answered correctly **Forms of Assessment** : Participatory Activities, Project Results Assessment / Product Assessment, Portfolio Assessment	- Group discussion - Case study 4 X 50		**Material:** Longitudinal beam calculations **References:** *Nawy, Edward G. 1998. Reinforced Concrete A Basic Approach. Bandung: PT. Refika Aditama.* **Material:** Longitudinal beam calculations **Reference:** *Asroni, Ali. 2010. Reinforced Beams and Plates. Yogyakarta: Graha Ilmu.* **Material:** Longitudinal beam calculations **Reference:** *Dipohusodo, Istimawan. 1994. Reinforced Concrete Structures. Jakarta: Gramedia Pustaka Utama.* **Material:** Longitudinal beam calculations **Reference:** *Anonymous. 2019. SNI-03-2847 - Procedures for Calculating Concrete Structures for Buildings. Jakarta: DPU.*	5%

12	Students are able to calculate cross beam reinforcement plans.	- Determine the maximum field moment and maximum support moment on 1 beam. - Calculate reinforcement requirements and determine the reinforcement to be installed. - Create reinforcement calculation tables for other beam conditions.	**Criteria:** Qualitative **Forms of Assessment** : Participatory Activities, Project Results Assessment / Product Assessment, Portfolio Assessment	- Group discussion - Case study 4 X 50		**Material:** Cross Beam Calculations **References:** *Nawy, Edward G. 1998. Reinforced Concrete A Basic Approach. Bandung: PT. Refika Aditama.* **Material:** Cross Beam Calculations **References:** *Asroni, Ali. 2010. Reinforced Beams and Plates. Yogyakarta: Graha Ilmu.* **Material:** Cross Beam Calculations **Reference:** *Dipohusodo, Istimawan. 1994. Reinforced Concrete Structures. Jakarta: Gramedia Pustaka Utama.* **Material:** Cross Beam Calculations **Reference:** *Anonymous. 2019. SNI-03-2847 - Procedures for Calculating Concrete Structures for Buildings. Jakarta: DPU.*	10%

13	Students are able to calculate column reinforcement plans.	- Determine P(axial) and Moment (maximum) in 1 column. - Calculate the condition of the column, whether it is a short column with eccentricity or a slender column so that the moment increase can be calculated. - Determine the column reinforcement ratio based on the Pn and Mn interaction diagram.	**Criteria:** Qualitative **Forms of Assessment** : Participatory Activities, Project Results Assessment / Product Assessment, Portfolio Assessment	- Group discussion - Case study 4 X 50		**Material:** Column structure calculations **References:** *Nawy, Edward G. 1998. Reinforced Concrete A Basic Approach. Bandung: PT. Refika Aditama.* **Material:** Column structure calculations **References:** *Asroni, Ali. 2010. Reinforced Beams and Plates. Yogyakarta: Graha Ilmu.* **Material:** Column structure calculations **Reference:** *Dipohusodo, Istimawan. 1994. Reinforced Concrete Structures. Jakarta: Gramedia Pustaka Utama.* **Material:** Column structure calculations **Reference:** *Anonymous. 2019. SNI-03-2847 - Procedures for Calculating Concrete Structures for Buildings. Jakarta: DPU.*	10%
14	Students are able to calculate foundation, roof, and sloof plans and reinforcement.	- Planning the size of the foundation based on the allowable soil stress. - Calculate the capacity of the foundation against shear. - Calculating mechanical analysis of the foundation to obtain moments. - Calculating flexible reinforcement for foundations. - Calculating poer and sloof.	**Criteria:** Qualitative **Forms of Assessment** : Participatory Activities, Project Results Assessment / Product Assessment, Portfolio Assessment	- Group discussion - Case study 4 X 50			5%

15	Students are able to draw details for trusses and connections, plate reinforcement, beams and columns	- Planning the size of the foundation based on the allowable soil stress. - Calculate the capacity of the foundation against shear. - Calculating mechanical analysis of the foundation to obtain moments. - Calculating flexible reinforcement for foundations. - Calculating poer and sloof.	**Criteria:** Qualitative **Forms of Assessment** : Participatory Activities, Project Results Assessment / Product Assessment, Portfolio Assessment	- Group discussion - Case study 4 X 50			10%
16							0%

Evaluation Percentage Recap: Case Study

No	Evaluation	Percentage
1.	Participatory Activities	33.34%
2.	Project Results Assessment / Product Assessment	33.34%
3.	Portfolio Assessment	33.34%
		100%

Notes

1. **Learning Outcomes of Study Program Graduates (PLO - Study Program)** are the abilities possessed by each Study Program graduate which are the internalization of attitudes, mastery of knowledge and skills according to the level of their study program obtained through the learning process.
2. **The PLO imposed on courses** are several learning outcomes of study program graduates (CPL-Study Program) which are used for the formation/development of a course consisting of aspects of attitude, general skills, special skills and knowledge.
3. **Program Objectives (PO)** are abilities that are specifically described from the PLO assigned to a course, and are specific to the study material or learning materials for that course.
4. **Subject Sub-PO (Sub-PO)** is a capability that is specifically described from the PO that can be measured or observed and is the final ability that is planned at each learning stage, and is specific to the learning material of the course.
5. **Indicators for assessing** abilities in the process and student learning outcomes are specific and measurable statements that identify the abilities or performance of student learning outcomes accompanied by evidence.
6. **Assessment Criteria** are benchmarks used as a measure or measure of learning achievement in assessments based on predetermined indicators. Assessment criteria are guidelines for assessors so that assessments are consistent and unbiased. Criteria can be quantitative or qualitative.
7. **Forms of assessment:** test and non-test.
8. **Forms of learning:** Lecture, Response, Tutorial, Seminar or equivalent, Practicum, Studio Practice, Workshop Practice, Field Practice, Research, Community Service and/or other equivalent forms of learning.
9. **Learning Methods:** Small Group Discussion, Role-Play & Simulation, Discovery Learning, Self-Directed Learning, Cooperative Learning, Collaborative Learning, Contextual Learning, Project Based Learning, and other equivalent methods.
10. **Learning materials** are details or descriptions of study materials which can be presented in the form of several main points and sub-topics.
11. **The assessment weight** is the percentage of assessment of each sub-PO achievement whose size is proportional to the level of difficulty of achieving that sub-PO, and the total is 100%.
12. TM=Face to face, PT=Structured assignments, BM=Independent study.